INTENSIVE FARMING.

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The subject of intensive farming is claiming the attention today of many thoughtful men. Especially is this true near large cities where the supply of vegetables and of dairy and poultry products is much in demand. By intensive farming we mean thorough and scientific cultivation of the land, so that the soil will produce crops to its limit of production. It is commonly followed by those engaged in the dairy business or truck farming. Most of the farmers engaged in crop farming have not yet learned the need of this intensive method of cultivation, nevertheless this country will eventually,sooner or later, practice intensive farming as the population increases. In foreign countries where the population is very dense such farming is the only kind followed. In France for instance families will subsist on the products of an acre or two of land.

As our population increases it has been rapidly pushing westward, making the desert blossom as the rose, but the western border has long since been reached and the word homestead has almost become obsolete. With the exception of a few small Indian reservations which still remain to be opened to the public, the good arable land has all been taken. These small reservations will be but a small item compared to the great army of men who are waiting to take advantage of such opportunities.

What then is the solution of the problem. I believe that the small farm, well tilled, will give the solution,for two reasons, viz. the first cost both of land and equipment is small; and reliable labor for the farm is getting scarce and the small farm may be run with less hired help, thus saving wages and at the same time getting rid of much worry and vexation. To the young farmer the first point is of very great importance. The majority of young men must go out as wage earners to get a start in life; that means long years of

service or the assuming of large debts before the young man begins business for himself, unless he takes the plan of buying the smaller tract of land and begins farming operations in an intensive manner. Many of our best farmers have begun as wage earners. A large majority of wage earners however have not been willing to pay the price of long weary years of saving and economy in order to purchase a fair sized tract of land. Instead of saving and beginning in a small way they have spent their money as fast as they have earned it, and as a result are still wage earners.

Dairy farming is perhaps the most common form of intensive farming, and is the one we will consider. That is,we will try to arrange a system of crops for the dairy cow that will supply her with a good amount of nutritious food. We will also try to take into consideration a logical system of crop rotation. We will take a forty acre farm and plot it into fields as nearly the same size as possible, in order that as the rotation progresses from year to year the same amount of feed will be produced, providing the seasons are favorable.

Crops Grown.

In the feeding of stock alfalfa is almost an essential; we will therefore include alfalfa in the rotation plan. The farm is divided into five equal fields of seven acres each and a home lot of five acres. The rotation consists of alfalfa five years, grass five years, and the yearly rotation of one field devoted to corn and oats for seed and feed, one field to corn and cowpeas for ensilage, and one field for soiling crops. These will consist of corn to be cut green and fed, barley and field peas, oats, and cowpeas,and rye, which will be used as a late fall and early spring feed. The rye will last in spring until oats and cowpeas are large enough for soiling, or

these crops may be supplemented with green alfalfa. Then will come the barley and field peas, after which will come the corn. In Kansas this succession of crops will keep the stock in green succulent feed during the entire summer and save a large amount of pasture.

Professor Henry says the great advantages in soiling stock are: first, saving of land; second, saving of fencing; third, the economizing of food; fourth, better condition and greater comfort of cattle; fifth, greater production of milk; sixth, the making and saving of manure. The same authority gives the results of a comparative experiment with six cows, three cows on pasture and three cows in the barn and yard, fed soiling crops. The cows on pasture required 3.7 acres of land to furnish the necessary feed, while the cows fed soiling crops required only 1.5 acres to supply all necessary feed, and the latter gave more milk and made more butter, showing that one acre of soiling crops was about equal to 2.5 acres of pasture.

Intensive Farming Experiments.

The writer conducted some experiments at the Kansas State Agricultural College with potatoes followed by forage crops, which were intended to show what could be grown on a piece of ground by continual cropping.

On April 1st the ground was plowed and harrowed and put into fine condition for the seed. The potatoes were cut into two-eye pieces and planted with a two-horse planter, in hills two inches apart. The plots were so divided as to contain one-tenth acre each, except the check plot, which contained but five rows, making one-twelfth of an acre. The potatoes came up and made a fine stand and were kept in fine condition until June 21st, when the blight struck them and ruined the potato crop. The vines were sprayed with

Bordeaux mixture but the blight had already destroyed the crop, and but few potatoes matured. June 22nd the plots were all seeded except the check plot. Plot I. was planted to corn and cowpeas, for forage. The seed was mixed and drilled in rows between the potatoes. Plot II. was planted to soy beans, also in rows between the potato rows. Plot III. was planted to Kafir corn, in rows. Plot IV. was the check plot and was not sown to forage crops. Plot V. was sown to cowpeas with a one-horse disk drill run between the rows. Plot VI. was planted with sorghum sown in the same manner as Plot V. Plot VII. was sown to millet in the same way.

On July 25-28 the potatoes on Plots I., II., and III., were dug by hand in order that the other late crops might be cultivated.

The land seemed to be very foul with crab-grass, and August 14-15 these first three plots were hoed by hand.

Sept. 20th the corn and cowpeas on Plot I. were cut for ensilage. The corn was rather slender and was a poor stand but had tasseled and silked and the mixture made fine feed. The cowpeas on Plot V. were also cut for hay at this time. There was a good stand and a rank growth of vines. They were cut with a scythe and hauled directly from the field to cutter and put into silo.

On Oct. 12th the Kafir corn was cut and shocked on Plot III., as was also the sorghum on Plot VI.

On Oct. 25-26 the remainder of the potatoes were dug, on Plots IV., V., VI., & VII. The soy beans on Plot II. and the millet on Plot VII. were crop failures.

Table I.

Plot. No.	Crop after Potatoes.	Yield of Potatoes per acre bushels	Yield of Forage per acre tons
I.	Corn and cowpeas	68.7	(green) 8.5
II.	Soy beans	79.0	
III.	Kafir corn	69.2	(cured) 5.2
IV.	No crop except weeds (check)	62.4	
V.	Cowpeas	52.5	(green) 8.92
VI.	Sorghum	47.0	(cured) 8.5
VII.	Millet	56.0	

Summary.

On account of the blight no loss in yield of potatoes can be attributed to the crops which followed, as shown by the check plot. The chief difference in yield occured between the first three plots and the last four; the potatoes on the first three plots were dug earliest in the season and by hand, while on the last four plots the potatoes were dug three months later and were plowed out, the plow being followed with a hoe.

The poor yield of potatoes can be directly attributed to the blight, yet the purpose of the experiment remains the same.

A good yield of forage was grown upon Plots I., III., V., and VI. The failure of the soy beans was due to the rabbits' eating off nearly all of the soy beans while they were small. The millet on Plot VII. was such a poor stand that crab-grass was in much more prominence so the millet was not cut for hay. There was very little difference in the yield of corn and cowpeas and cowpeas, and the sorghum yielded 3-1/2 tons more fodder per acre than the Kafir corn. The sowed crops are to be preferred because there is less labor in the care of the

crops.

It should also be observed that the corn and cowpeas and cowpeas were cut and weighed while green, while the sorghum and Kafir corn were cured when weighed; the latter crops therefore made the largest yields in total dry matter, but the cowpea fodder is more nutritious, and the cowpeas enriched the soil, which is a very essential factor in favor of the crop, while the sorghum impoverished the soil.

The fact was thoroughly demonstrated at least, that crops can follow early spring crops with profit and that more feed may be grown upon the same ground at less cost than by the old single cropping system.

On this subject of double cropping I wish again to quote from Professor Henry's "Feeds and Feeding." In his article on "Soiling Crops" he says: "Where cattle are maintained by soiling, provision should be made for a succession of green crops for continuous feeding. In the table below, Lindsey gives the crops required for a complete soiling of ten cows:

Crop.	Seed per acre	Time of seeding	Area	Time of cutting
Rye	2 bushels	Sept.10-15	1/2 acre	May 20 - May 30
Wheat	2 "	" " "	1/2 "	June 1 - June 15
Red Clover	20 pounds	July 15- Aug. 1	1/2 "	June 15- June 25
Grass & Clover	1/2bu. Redtop 1/4 bu.Timothy 10# Red Clover	Sept.	2/3 "	June 15 - June 30
Vetch & Oats	3 bu. Oats 50# Vetch	April 20"	1/2 "	June 25 - July 10
Vetch & Oats	3 bu. Oats 50# Vetch	April 30"	1/2 "	July 10 - July 20
Peas & Oats	1-1/2 bu.Canada 1-1/2 bu.Oats	April 20"	1/2 "	June 25 - July 10
Peas & Oats	1-1/2 bu.Canada 1-1/2 bu.Oats	April 30"	1/2 "	July 10 - July 25
Barnyard Millet	1 peck	May 10"	1/3 "	July 25 - Aug. 10
" "	1 peck	May 25"	1/3 "	Aug. 10 - Aug. 20
Soy beans	18 quarts	May 20"	1/3 "	Aug. 25 - Sept.15
Corn		May 20"	1/3 "	Aug. 25 - Sept.10
Corn		May 30"	1/3 "	Sept. 10 - Sept.20
Hungarian	1 bushel	July 15"	1/2 "	Sept.20 - Sept.30
Barley & Peas	1-1/2 bu. Peas 1-1/2 bu.Barley	Aug. 5"	1 "	Oct. 1 - Oct. 20

"The above may prove a guide for those engaged in dairy farming, although all may not be able to follow in detail all the directions given."

"Many recognize the advantages of soiling but are deterred from practicing this method, arguing that the large amount of labor required in supplying the green forage daily more than offsets the benefits derived. There is both misconception and lack of knowledge on this point. Wilson shows that if green forage is gathered twice a week

and spread out not too thickly on the barn floor, it will keep in good condition until required for feeding. Most crops can be cut with a mower, gathered with a hay rake, and loaded directly on to the wagon. A dairy cow or a steer will require from 60# to 100# of green forage daily."

For those who can not practice soiling entirely, Professor Henry recommends partial soiling. "Partial soiling is practiced by all and should be followed on every well managed stock farm."

At Kingston, R.I., a five year rotation was practiced as follows:

First Year, Indian corn.
Second " , Potatoes.
Third " , Winter rye.
Fourth " , Grass.
Fifth " , Grass.

The summary of the results of carrying out this rotation of crops for five years is given in Bulletin No.76 of the Rhode Island Experiment Station, as follows:

"The land was so exhausted and is such poor tilth at the outset that without manure Indian corn plants produced no grain, and after four or five years of continuous cropping without manure they were unable to attain a height of more than about five inches during the entire season.

"Chemicals and fertilizer stock were the only manures employed.

"The plots were introduced into the experiment so that the five would show each stage of the rotation in any given year. Accordingly, in 1893 plot 31 began with Indian corn, plot 33 with potatoes, and plot 35 with rye. Plot 39 entered upon the rotation in 1894 and plot 37 in 1895, in each case with Indian corn. In twenty years, by this arrangement, twenty crops each of Indian corn, potatoes, and rye, and forty crops of grass are grown. If but one plot were employed, only four crops of a given kind, excepting grass, would be produced during the same interval.

"The financial results in the first course of the rotation (five years) were as follows:

Plot No.	Year of entering the rotation	Kind of crop the first year	Total net profit or loss in the five years
31	1893	Indian corn	Loss.....$24.60
33	1893	Potatoes	Loss..... 19.90
35	1893	Rye (spring)[1]	Profit..... 29.35
39	1894	Indian corn	Loss..... 22.20
37	1895	Indian corn	Profit..... 69.70

[1] Sown instead of winter rye because the experiment was begun in the spring.

"The crops of hay and potatoes in 1895 were severely injured by the unusual climatic conditions. The rye crop of 1893 failed completely, and that of 1894 nearly failed, owing to poor seed.

"Indian corn produced, in 1893, only 13.78 bushels of grain and 1.3 tons of stover per acre. In 1896 it produced 72.57 bushels of grain and 2.4 of stover. The highest yield of stover in any subsequent year upon any plot was 3.9 tons per acre. This was obtained in 1900, though the yield of shelled corn was less that season than in 1896.

"The potato crops have shown marked gains. The smallest crop of marketable tubers was that of 1893, which amounted to but 60 bushels per acre. The largest crop thus far recorded was 283.33 bushels per acre, in 1900 when the total yield of large and small tubers amounted to 321.66 bushels per acre.

"The results with rye have been very irregular, yet those of the later years give some indications that the supply of assimilable nitrogen in the soil is increasing. This, as in the three-year and four-year rotations, seems probable from the tendency to produce more straw in proportion to the grain than at the outset.

"Since the crops of Indian corn and potatoes have shown a marked

improvement in the later years and the grass crops have remained small, it is to be concluded that the latter have been receiving an insufficient amount of manure. This idea is further strengthened by the yields of hay in 1899 and 1900 (viz.: 6,913 and 8,200 pounds per acre) upon other plots, in close proximity to those employed in this experiment, where more liberal manuring resulted in larger crops and greater profit.

"It seems probable that if this rotation is to be begun upon very exhausted land it should commence with rye, so as to bring the potato crop at the end of the course. If, for any reason, potatoes must be introduced early in the rotation, it would seem advisable to apply all of the manure in the drill, instead of using a large part of it broadcast, as in the earlier years of this experiment."

In closing this discussion I wish to quote an article on this subject which I wrote and published in the Kansas Farmer, Oct. 12-1905 in answer to inquiry by W. H. Lowe, Douglas County, Kansas.

Question.

" From a dollar-and-cent standpoint which man is the better off in the course of five years, the ability of each being about equal - one receiving $720 per year with house rent and all other expenses to be paid out of his salary, or a farmer on a good sixty-acre farm?

"Iwould state that the man living in town receives a salary of $720 per year, has a family of three and lives in a town of 11,000 inhabitants. He pays $120 per year for rent, and keeps a horse and buggy, which his business makes necessary. All his expenses, such as grocery, meat, clothing, doctor's bills, and the keeping up of house, furniture, etc., comes out of his salary. He lives in a part of town where he can not make a garden and keeps no chickens. He has no bad habits, lives a plain life and uses every means to lay by a

little money.

"Our farmer has a sixty-acre farm located one mile from the city of Ottawa, Kansas, has a fair house, a fair barn, good water, good chicken-house, poor hog-house, and his farm is poorly fenced. He has about 25 acres of bottom-land, the balance is second bottom. All of the land can be and is cultivated - is as good as the average Eastern Kansas farm. It has some small fruit, say about $50 worth per year, and a young orchard which has not yet come into bearing. The land will grow good corn, grass, and wheat, or any of the general farm crops grown in this section. The farm is now growing corn with only about four acres of pasture, which is not very good. There is no timber on the place, and no grass except the four acres which is used as hog-pasture. The farmer's family is three in number. The ability of both men is supposed to be about the same. The farmer has all the tools necessary for a sixty-acre farm and feeds all grain raised on the farm. The city man has all tools necessary for his business.

"Now which man will be the best off in dollars and cents at the end of five years, leaving out of consideration the fact that the farmer had 60 acres of land and the tools necessary to run a farm of this size? I may also state that the farmer has three sows and one cow, which I suppose would be rated as stock and should not be counted, except the increase.

"I may state that both of these men are now working on a $720 salary and one is going back to the farm in March, thinking he will be better off in five years, also thinking it will give him more pleasure in life."

Answer.

"I am glad to answer your letter as it directly interests me personally. I thoroughly believe in the small farm worked intensively, as is done in the East and in the European countries.

"To start with, I can do no better than to quote Prof. W. J. Spillman, in the 1903 Year Book of the U. S. Department of Agriculture, from an article entitled 'The Model Farm.'

" 'The methods of management on this fifteen-acre farm that raises all the roughage for thirty head of stock, seventeen of which are cows in milk, cannot fail to interest farmers in all parts of the country. The farm is in Southeastern Pennsylvania, near a large city. About thirteen acres are in cultivation, the remaining two acres being occupied by buildings, yards, etc. This farm came into possession of the present owner in 1881, with a mortgage of $7,200 upon it. For the first year the farm lacked $46 of paying expenses. During the next six years the mortgage was paid.'

"The man was a minister, besides practicing what he called book farming. When he went onto the farm it would not keep two cows and a horse. No commercial fertilizers have ever been used. The crops are all fed upon the farm, nothing being bought except the concentrated feed-stuffs,which cost about $625 a year. The milk is sold at twenty-five cents per gallon, which gives an income of about $2,400 a year. In addition to this about five head of young cattle are sold each year at an average price of $100 each.

"The cows are kept in the barn the year around and are fed soiling crops in summer and hay and ensilage in winter. The manure, both solid and liquid are put on the land as made. The farm is divided into small plots, upon which is grown a succession of forage crops each year, so that it is always possible to put manure on some part of the farm every day. The cattle are all perfectly healthy, one cow being a profitable milk-producer at fifteen years of age.

"In the past six years only $1.50 has been expended for veterinary services. Professor Spillman says he never saw a more thrifty

herd of cattle.

"The work on the farm is done by a man and a boy, except when green forage is not available and in winter. The work is arranged by calendar and so thoroughly outlined that each plot of ground is planted approximately at the same date each year. Little variation is necessary because of the excellent condition of the soil, made so by using so much good manure, properly handled. This land holds the moisture much longer and can be worked after a rain much quicker than other lands which are less carefully and properly farmed. Every farmer should read this article by Professor Spillman, for himself, because it is such a revelation as to what may be done on small farms.

"A man who owned a good 160-acre farm told the writer that if it were divided equally between two families it would not support them. This most of us know is an erroneous idea, as the facts show. Many truck gardeners make even more on small farms than does the above-mentioned farmer, but of course they have a larger outlay for fertilizers and labor.

"The small farm farmed intensively is, I think, the best solution to the hired-help problem. If every man does his own work he is sure of having it done well. If the work is not so arranged as to become drudgery, there is no reason why any strong, healthy man can not more thoroughly enjoy such work than the man who works in the office, breathing the impure air of the city.

"The farm work should be so arranged that the farmer may spend his evenings with his family, or reading in the library. I believe in the old saying, 'Early to bed and early to rise, makes a man healthy, wealthy and wise.' I believe this can be put into practice more readily by the farmer than by any one else, and in my judgment there is no reason why the farmer can not be the happiest and healthiest man living.

"I would compare the circumstances of the two men in question at

the end of five years, as follows:

"The farm of sixty acres should keep at least sixty head of milch cows, and these giving annually 5,000 pounds of milk each (a very low average yield) would make a total annual product of 150,000 quarts, which in the city market should be worth at least five cents a quart. This would net $7,500 per year. Three men should do the work on this farm for such a herd of cows, or two men besides the proprietor. Wages at $30 per month would be $720 per year. The concentrates would cost about $1,000 per annum for the herd of sixty, all roughage could be raised on the farm. This would leave an income of $5,780. Suppose in order to take no chances we cut this amount in two, allowing an average annual income of $2,890. Of course the cows would have to be bought and a dairy fitted up, which would amount to at least $2,500 for cattle, and $2,000 for dairy buildings and a cow barn. According to my calculations, the profits of the business would easily purchase the cows and pay for the equipment in the first two years; during the next three years the farmer should be able to clear $6,000 to $8,000 from his business, while the man in town could not lay up more than $1000 in the five years and live comfortably, because the expenses of living in town are greater than on the farm. Of course the man in town should be gaining in proficiency and get better pay in that time; but if both men were of equal intelligence and energy, the man on the farm would be a great way ahead of the city man financially at the end of five years."